

REMARKS

Interview

Applicants appreciate the Examiner's time and comments during the interview of April 23, 2009.

Amendment To Claims

After discussing this application with the Examiner during the interview and in order to advance the prosecution of this application, Applicants are amending independent Claims 1, 4, 7, 10, 13, 16 and 59 to recite the features of:

(1) wherein said liquid phase film deposition chamber is provided with a mechanism for pressurizing with an inert atmosphere,

(2) wherein said liquid phase film deposition chamber is filled with an inert gas during film deposition process; and

(3) wherein said liquid phase film deposition chamber is provided with a third mechanism for supplying an organic material including solvent.

As explained below, these features distinguish the claimed invention over the cited references.

In light of these amendments, Applicants is also amending dependent Claims 2, 5, 8, 11, 14 and 17.

In addition, Applicants noticed a few minor errors and/or incorrect words in Claims 57, 58 and in some of the independent claims. Accordingly, Applicants are amending these claims to correct these informalities.

Applicants have the following response to the rejections in the Office Action.

Claim Rejections - 35 USC §103

In the Office Action, the Examiner had the following rejections under 35 USC §103:

1. Claims 1, 13, 31, 47, 51 and 59-60 as being unpatentable over Hiraga et al. (US 6,139,321) in view of Harrah et al. (US 4,405,487) and Matsuura et al. (US 6,001,413) and Schoen et al. (US 4,322,230).
2. Claims 2 and 14 as being unpatentable over Hiraga et al., Harrah et al. and Matsuura et al. and Schoen and further in view of Begin et al. (US 5,310,410).
3. Claims 3 and 15 as being unpatentable over Hiraga et al., Harrah et al. and Matsuura et al. and Schoen and further in view of Kakei et al. (US 3,931,789).
4. Claims 4, 34 and 38 as being unpatentable over Hiraga et al. in view of Harrah et al., Matsuura et al. in view of Conte and Schoen.
5. Claim 5 as being unpatentable over Hiraga et al., Harrah et al., Matsuura et al. and Conte and Schoen and further in view of Begin et al.
6. Claim 6 as being unpatentable over Hiraga et al., Harrah et al., Matsuura et al. and Conte and Schoen further in view of Kakei et al.
7. Claims 7-8, 10-11, 16-17, 37, 49 and 52 as being unpatentable over Hiraga et al. in view of Harrah et al., Matsuura et al., Begin et al. and Schoen.
8. Claims 9 and 18 as being unpatentable over Hiraga et al., Harrah et al., Matsuura et al., Begin et al. and Schoen and further in view of Kakei et al.
9. Claims 10, 11, 40 and 50 as being unpatentable over Hiraga in view of Harrah, Matsuura, Begin and Conte and Schoen.
10. Claim 12 as being unpatentable over Hiraga, Harrah, Matsuura, Begin, Conte and Schoen and further in view of Kakei.
11. Claims 32-33 and 61-62 as being unpatentable over Hiraga, Harrah, Matsuura et al. and Schoen and further in view of Zheng (US 6,124,215).
12. Claims 35 and 36 as being unpatentable over Hiraga, Harrah, Matsuura et al., Conte and Schoen and further in view of Zheng.
13. Claims 38-39 and 45-46 as being unpatentable over Hiraga, Harrah, Matsuura et al., Begin and Schoen and further in view of Zheng.
14. Claims 41 and 42 as being unpatentable over Hiraga, Harrah, Matsuura et al., Begin, Conte and Schoen and further in view of Zheng.

15. Claims 43 and 44 as being unpatentable over Hiraga, Harrah, Matsuura et al., Schoen and further in view of Zheng.
16. Claims 53 and 57 as being unpatentable over Hiraga et al., Harrah, Matsuura and Schoen and further in view of Walter (U.S. 4,118,542).
17. Claim 54 as being unpatentable over Hiraga et al., Harrah, Matsuura et al. and Conte and Schoen and further in view of Walter.
18. Claims 55 and 58 as being unpatentable over Hiraga et al., Harrah et al., Matsuura et al. and Bergin et al. and Shoen et al. and further in view of Walter.
19. Claim 56 as being unpatentable over Hiraga et al., Harrah et al., Matsuura et al., Begin et al., Conte and Schoen et al. and further in view of Walter.

Each of these rejections is respectfully traversed.

Each of the rejections relies upon a combination of Hiraga, Harrah, and Matsuura (and other references as deemed necessary by the Examiner, such as for example, Conte). While Applicants traverse these rejections, in order to advance the prosecution of this application and to clarify the claimed invention, as explained above, Applicants are amending independent Claims 1, 4, 7, 10, 13, 16 and 59. It is respectfully submitted that the amended claims are not disclosed or suggested by the cited references, and that it is improper to combine the references to arrive at the claimed invention.

More specifically, Hiraga (and Matsuura) teaches a liquid phase film deposition method in vacuum. In contrast, in the present invention, a liquid phase film deposition is not conducted in vacuum. See e.g. page 9; lines 14-22 in the specification of the present application. Applicants have amended the claims to recite the above phrases (1) and (2) to recite this feature. This claim language clearly distinguishes the cited references.

In addition, Applicants respectfully submit that the combination of references to arrive at the claimed invention is improper.

In particular, the claims of present application include the feature of wherein said liquid phase film deposition chamber is provided with a second mechanism for oxidizing an element belonging to Group 1 or 2 of periodic table.

Hiraga does not disclose this claimed feature as acknowledged in the Office Action. The rejection, however, cites Harrah as teaching use of moisture getter comprising metal (Mg – Group 2) in closed container to scavenge moisture. The rejection then contends that it would have been obvious to provide a mechanism for oxidizing an element belonging to Group 1 or Group 2 of the periodic table in Hiraga in order to scavenge moisture within chamber as taught by Harrah and cites Matsuura in support of the combination.

Applicants respectfully disagree and submit that this combination of references to arrive at the claimed invention is improper.

As Applicants previously explained, Hiraga teaches that one only has to use a sealed vessel to completely remove contaminant gases, including oxygen and water vapor. Hence, there is no reason, motivation or suggestion to add something further (i.e. a foreign substance such as in Harrah) to remove water vapor that has already been removed. Therefore, there is no reason, motivation or suggestion to combine Hiraga with Harrah to arrive at the claimed invention.

In the pending Office Action, the rejection states (at #10) that “Harrah et al. and Hiraga et al. do not explicitly teach why one of ordinary skill in the art might combine two apparatus that to some may appear to individually provide solutions to a common problem.” The rejection then argues that (at #11) “Matsuura et al. teach that even when substrates are provided in a vacuum enclosure, over time contaminants and impurities may be introduced into the enclosure, thus causing failure or destabilization of the substrates (column 2, rows 17-35). Therefore, even if at some point in time the apparatus of Hiraga et al. is in a ‘clean’ state, over time this state may

become diminished. Thus, means for addressing the contaminants and/or impurities besides just providing a clean container at the outset would make sense.” The rejection then concludes that (at #12) “It would have been obvious to one of ordinary skill in the art at the time the Applicant’s invention was made to have provided the apparatus/closed container of Hiraga et al. with a mechanism for oxidizing an element belonging to Group 1 or 2 of the periodic table in order to scavenge moisture from the chamber that may be introduced after time has lapsed as taught by Harrah et al. and Matsuura et al.”

Applicants respectfully disagree that Matsuura provides the reason for combining Hiraga and Harrah.

As explained above, Hiraga states that it completely removes contaminant gases. The Examiner, however, cites Matsuura as teaching impurities can diminish the clean state of Hiraga.

First, there is nothing in Hiraga that suggests this is true.

Second, Matsuura states that impurities exist in the vacuum chamber which can contaminate the substrate. There is no mention in Matsuura as to what these contaminants are. There is no mention that these contaminants are moisture or water vapor. Hence, there is no reason why one would look to Harrah to scavenge moisture since it is not even known if that is a problem/impurity from Matsuura. There is also no mention of scavenge in Matsuura.

Matsuura teaches a different way than Higara or Harrah to avoid contaminants. How does this lead to Harrah?

Matsuura says that solvent can be impurity, but Higara and present invention use solvent for film deposition. Why would this lead one to Higara (and why would it lead one to use Harrah)?

In addition, the present invention is concerned with high molecular materials. Matsuura is directed to low molecular materials. So why would one look to Matsuura?

Matsuura discloses that "It is known that contamination of substrates causes the reduction in the capabilities of EL devices. In particular, in organic EL devices, contamination of the electrode/organic layer interface and the organic layer/organic layer interface is one factor of interfering with the carrier injection from the substrate electrode into the organic layers, thereby having noticeable negative influences on the capabilities of the devices."(Column 1, line 30 - Column 2, line 37) The present invention, however, states that "However, the organic EL materials readily change their molecular structure through oxidization, losing their ability of emitting light. In other words, a light emitting layer formed from an organic EL material is oxidized to deprive an EL element of its ability of emitting light and degrade the EL element. It is thus important in manufacturing an EL element of high reliability to remove oxygen (O₂) that accelerates oxidization of the organic EL material as much as possible after the organic EL material has been formed. "

The mechanism of the degradation is also different between Matsuura and the present invention.

Therefore, there is no reason, motivation or suggestion to combine Higara with Harrah to arrive at the claimed invention. As explained above, Matsuura does not provide a reason, motivation or suggestion to combine these references.

Furthermore, Applicants have amended independent Claims 1, 4, 7, 10, 13, 16 and 59 to recite the feature of: wherein said liquid phase film deposition chamber is provided with a third mechanism for supplying an organic material including solvent. As discussed above, this feature is not disclosed or suggested in Matsuura, and in fact, Matsuura teaches that solvent is one of

contaminants (impurities) to be eliminated. Hence, this is a further reason one skilled in the art would not combine Matsuura with Hiraga to arrive at the claimed invention.

As a reason, motivation or suggestion is necessary to combine references to reject the claims, the combination and rejections based thereon are improper. In addition, as explained above, independent Claims 1, 4, 7, 10, 13, 16 and 59 and those claims dependent are not disclosed or suggested by the cited references, and the claims are patentable over these references.

Accordingly, it is respectfully requested that all the §103 rejections be withdrawn.

New Claims

Applicants are also adding new dependent Claims 63-76. These claims are supported at, for example, page 7 et seq. of the specification of the present application.

As these are dependent claims, they are allowable for at least the reasons discussed above for the independent claims. In addition, these claims recite the feature that the EL material is a high molecular organic EL material. As explained above, Matsuura is directed to low molecular materials. Hence, it would not be proper to use Matsuura to reject these new claims.

Accordingly, it is respectfully requested that these new claims be entered and allowed.

If any fee should be due for these new claims, please charge our deposit account 50/1039.

Conclusion

It is respectfully submitted that the present application is in condition for allowance, and should be allowed.

If any fee should be due for this amendment and/or the new claims, please charge our deposit account 50/1039.

Favorable reconsideration is earnestly solicited.

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